



ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Ordinary Level

METAL TECHNOLOGY AND DESIGN

4055/3

PAPER 3 Design Project

NOVEMBER 2019 SESSION

Time: 3 terms

No additional materials are required.

INSTRUCTIONS TO CANDIDATES

Attempt **one** option only.

This question paper consists of 3 printed pages and 1 blank page.

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General Notes

When candidates are working on these projects, the application of electronics, IT and mechanical mechanisms is central to the effective solving of Design problems in line with the updated Metal Technology and Design syllabus.

N.B Candidates are allowed and encouraged to produce a scaled down version of their design when realising the artefact. They are also encouraged, where possible and relevant, to combine different materials e.g metal and wood or plastic, in realising their designs, provided the predominant material remains metal.

Candidates should choose **one option only** and produce a:

- (i) detailed **A3 Design Folio** showing the development of the design process from the situation through to the final drawings of the solution. The final section of the folio should include the evaluation,
- (ii) well constructed mock-up/model of the chosen solution, in any suitable material,
- (iii) well constructed artefact of the chosen solution.

OPTION 1 MACHINE WORK

A number of small scale entrepreneurs in Zimbabwe are involved in manual production of quarry stones used for construction. Many individuals and even large organisations prefer the quarry stones produced by these entrepreneurs due to the lower prices they charge when compared to formal companies involved in the same business. The process of producing this quarry is labour intensive while the output is extremely low and not safe.

Design and make a low cost device which can be used by small scale entrepreneurs for the production of quarry stones. The device should be:

- easy to operate
- durable
- portable
- cost effective and should be manually or electrically operated.

OPTION 2 SHEET METALWORK AND WELDING

In an effort to improve the diet of learners, a school has added fresh chips as part of their menu. The use of knives to slice potatoes is time consuming, tiresome and cumbersome for the kitchen staff. There is need for an easy and quicker method of slicing the potatoes.

Design and make a device which can be used to slice potatoes in large quantities at a time.

The device should:

- produce potato slices of the same thickness
- be portable
- be durable
- resist corrosion
- allow minimum handling of the potato.

Your device can be hand driven or power operated.

OPTION 3 FORGEWORK

A game park requires an advertising unit at the entrance to the park which depicts the head of one of the big five animals commonly found in the game park.

Design and make a unit which depicts the head of one of the big five animals that can be positioned at the entrance of the park.

Your design should:

- have provision to be fixed at the entrance of the game park
- be seen clearly from a distance of 500 m even at night
- resist corrosion
- be durable

Incorporate at least **three** forgework processes.

NB Candidates are also encouraged, where possible and relevant, to combine different materials e.g. metal and wood or plastic, in realising their designs, provided the predominant material remains metal.

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